INITIAL EXPRESS TERMS
FOR
PROPOSED BUILDING STANDARDS
OF THE
OFFICE OF THE STATE FIRE MARSHAL

REGARDING PROPOSED CHANGES TO
2016 CALIFORNIA FIRE CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 9

The Office of the State Fire Marshal (OSFM) proposes to make necessary changes to the 2016 edition of the California Fire Code (CFC), based on the 2015 International Fire Code (IFC) model code. The OSFM further proposes to:

- Adopt necessary amendments to the model code;
- Repeal amendments to the model code that are no longer necessary.

LEGEND FOR EXPRESS TERMS

1. Existing California amendments or code language being modified are in italics when they appear in the model code text: All such language appears in *italics*, modified language is underlined.
2. New California amendments: All such language appears *underlined and in italics*.
3. Repealed text: All such language appears in ~~strikeout~~.

[Item 1. On-Demand Mobile Fueling Operations.]

SECTION 5707 ON-DEMAND MOBILE FUELING OPERATIONS

***5707.1 General**. On-demand mobile fueling operations that dispense Class I, II, and III liquids into the fuel tanks of motor vehicles shall comply with Sections 5707.1 through 5707.6.3.*

***Exception**: Fueling from an approved portable container in cases of an emergency or for personal use.*

***5707.1.1 Approval required**. Mobile fueling operations shall not be conducted without first obtaining a permit and approval from the fire code official. Mobile fueling operations shall occur only at approved locations.*

***5707.2 Mobile fueling vehicle**. An on-demand mobile fueling vehicle shall be one of the following:*
1. A vehicle that has chassis-mounted tanks or containers where the aggregate cargo capacity does not exceed 1200 gallons (4592 L). A mobile fueling vehicle with a mounted tank in excess of 110 gallons (415 L) shall comply with the requirements of Section 5706.6, Section 5707, and NFPA 385.

2. A vehicle that carries a maximum of 60 gallons (227 L) of motor fuel in metal safety cans listed in accordance with UL 30 or other approved metal containers each not to exceed 5 gallons (19 L) in capacity. Containers shall be secured to the mobile fueling vehicle except when in use.

The mobile fueling vehicle shall comply with the requirements of all local, state and federal requirements. The mobile fueling vehicle and its equipment shall be maintained in good repair.

***5707.3 Required documents**. Documents developed to comply with Sections 5707.3.1 through 5707.3.3 shall be updated as necessary by the owner of the mobile fueling operation and shall be maintained in compliance with Section 107.3.*

***5707.3.1 Safety and emergency response plan**. Mobile fueling operators shall have an approved written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code.*

***5707.3.2 Training records**. Mobile fueling vehicles shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.*

***5707.3.3 Site plan**. Where required by the fire code official, a site plan shall be developed for each location at which mobile fueling occurs. The site plan shall be in sufficient detail to indicate: all buildings, structures, lot lines, property lines, and appurtenances on site and their use or function; all uses adjacent to the lot lines of the site; fueling locations, the locations of all storm drain openings, and adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained upon the site property; and the scale of the site plan.*

***5707.4 Mobile fueling areas**. Mobile fueling shall not occur on public streets, public ways, or inside buildings. Fueling on the roof level of parking structures or other buildings is prohibited.*

***5707.4.1 Separation**. Mobile fueling shall not take place within 25 feet (7620 mm) of buildings, property lines, or combustible storage.*

***Exception**: The fire code official shall be authorized to decrease the separation distance for dispensing from metal safety cans or other approved metal containers in accordance with Section 5707.2. When dispensing operations occur within 15 feet (457 2 mm) of a storm drain, an approved storm drain cover or an approved equivalent method that will prevent any fuel from reaching the drain shall be used.*

***5707.4.2 Sources of ignition**. Smoking, open flames, and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the mobile fueling vehicle. The engines of vehicles being fueled shall be shut off during fueling.*

***5707.5 Equipment**. Mobile fueling equipment shall comply with Sections 5707.5.1 through 5707.5.4.*

***5707.5.1 Dispensing hoses and nozzles**. Where equipped, the dispensing hose shall not exceed 50 feet (15 240 mm) in length. The dispensing nozzles and hoses shall be of an approved and listed type.*

***5707.5.2 Fuel limit**. Mobile fueling vehicles shall be equipped with a fuel limit switch set to a maximum of 30 gallons (116 L) and a nozzle or other approved device that, when activated, immediately causes flow of fuel from the mobile fueling vehicle to cease.*

***5707.5.3 Fire extinguisher**. An approved portable fire extinguisher complying with Section 906 with a minimum rating of 40-B:C shall be provided on the mobile fueling vehicle with signage clearly indicating its location.*

***5707.5.4 Spill kit**. Mobile fueling vehicles shall contain a minimum 5 gallon (19 L) spill kit of an approved type.*

***5707.6 Operations**. Mobile fueling vehicles shall be constantly attended during fueling operations with brakes set and warning lights in operation. Mobile fueling vehicles shall not obstruct emergency vehicle access roads.*

***5707.6.1 Dispensing hose**. Where equipped, mobile fueling vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the mobile fueling vehicle.*

***5707.6.2 Drip control**. Operators shall place a drip pan or an absorbent pillow under the nozzle to catch drips and under each fuel fill opening prior to and during dispensing operations.*

5707.6.3 *Spill reporting. Spills shall be reported in accordance with Section 5003.3.1.*

105.6.17 Flammable and combustible liquids. An operational permit is required:

[Authors Note Items 1-9 of Section 105.6.17 to remained unchanged]

11. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments *in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707*.
12. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments *in accordance with Section 5706.5.4 or, where required by the fire code official, to utilize a site for on-demand mobile fueling operations in accordance with Section 5707*.

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13143.9, 13146, 13210, 13211 and 18949.2
Reference(s): Health and Safety Code Sections 13143, 13211, & 18949.2

[Item 2. Correlation of Building Code regulations for Automatic fire sprinklers in elevator machine area clarification]

[Chapter 80 – Referenced Standards]

****NFPA 13, Amended Sections as follows:***

****Revise Section 8.15.5.3 to read as follows:***

8.15.5.3 ***Automatic sprinkler system.*** *Automatic sprinklers shall not be required to be installed in the elevator hoistway, elevator machine room, elevator machinery space, elevator control space, or elevator control room where all the following are met:*

1. Approved smoke detectors shall be installed and connected to the building fire alarm system in accordance with Section 907 in the area where the fire sprinkler was removed per this section.
2. Activation of any smoke detector located in the elevator hoistway, elevator machine room, elevator machinery space, elevator control space, or elevator control room shall cause the actuation of the building fire alarm notification appliances in accordance with 907.
3. Activation of any smoke detector located in the elevator hoistway, elevator machine room, elevator machinery space, elevator control space, or elevator control room shall cause all elevators having any equipment located in that elevator hoistway, elevator machine room, elevator machinery space, elevator control space, or elevator control room to recall nonstop to the appropriate designated floor in accordance with CCR Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.
4. The elevator machine room, elevator machinery space, elevator control space, or elevator control room shall be enclosed with fire barriers constructed in accordance with Section 707 or horizontal assemblies constructed in accordance with Section 712, or both. The fire-resistance rating shall not be less than the required rating of the hoistway enclosure served by the machinery. Openings in the fire barriers shall be protected with assemblies having a fire protection rating not less than that required for the hoistway enclosure doors. The exceptions to Section 3005.4 shall not apply.
5. The building fire alarm system shall be monitored by an approved supervising station in accordance with 907.
6. An approved sign shall be permanently displayed in the room where the fire sprinkler was removed per this section in a conspicuous location with a minimum of 1½ inch letters on a contrasting background, stating:

NO COMBUSTIBLE STORAGE
PERMITTED IN THIS ROOM

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 3. Correlation of Building Code regulations for Multipurpose Residential Fire Sprinkler Systems clarification and modifications]

[Chapter 80 – Referenced Standards]

NFPA 13D, Amended Sections as follows:

Add new Section 6.2.4 to read as follows:
6.2.4 *Where a water supply serves both domestic and fire sprinkler systems, 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point where the systems are connected, to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler. For multipurpose piping systems, the 5 gpm (19 L/min) demand shall be added at the domestic connection nearest the design area. This demand may be split between two domestic connections at 2.5 gpm (10 L/min) each.*

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 4. Correlation of Building Code regulations for Stand-alone Pump and Tanks in residential fire sprinklers clarification and modifications]

[Chapter 80 – Referenced Standards]

NFPA 13D, Amended Sections as follows:

Revise Section 6.2.2 to read as follows:
The following proposed code change would be reflected in the California Building Code (Chapter 35), California Residential Code (Chapter 44), and California Fire Code (Chapter 80), relating to the referenced standard NFPA 13D, 2016 Edition.

6.2.2 Where a *well,* pump, tank *or combination thereof* is the source of supply for a fire sprinkler system, *the configuration for the system shall be one of the following:*

(1) ~~the~~The water supply shall serve both domestic and fire sprinkler systems, ~~and~~ the following shall be met
(~~1~~a) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. The connection shall return water to the tank.
(~~2~~b) Any disconnecting means for the pump shall be approved.
(~~3~~c) A method for refilling the tank shall be piped to the tank.
(~~4~~d) A method of seeing the water level in the tank shall be provided without having to open the tank.
(~~5~~e) The pump shall not be permitted to sit directly on the floor.

2. A stand-alone tank is permitted if the following conditions are met:
(a) The pump shall be connected to a 220 volt circuit breaker shared with a common house hold appliance (E.g. range, oven, dryer),
(b) The pump shall be a stainless steel 240 volt pump,

(c) A valve shall be provided to exercise the pump. The discharge of the exercise valve shall drain to the tank, and
(d) A sign shall be provided stating "Valve must be opened monthly for 5 minutes."
(e) A means for automatically refilling the tank level, so that the tank capacity will meet the required water supply duration in minutes shall be provided.
(f) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. The connection shall return water to the tank.
(g) Any disconnecting means for the pump shall be approved.
(h) A method for refilling the tank shall be piped to the tank.
(i) A method of seeing the water level in the tank shall be provided without having to open the tank.
(j) The pump shall not be permitted to sit directly on the floor.

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 5. Educational editorial changes to removal duplication and provide clarity.]

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 square feet (1115 m^2) in area.

2. Throughout every portion of educational buildings below the lowest *level of exit discharge* serving that portion of the building.

> **Exception:** An automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area where every classroom throughout the building has at least one exterior *exit* door at ground level.

3. In rooms or areas with special hazards such as laboratories, vocational shops and other such areas where hazardous materials in quantities not exceeding the maximum allowable quantity are used or stored.
4. Throughout any Group E structure greater than 12,000 square feet (1115 m^2) in area, which contains more than one fire area, and which is separated into two or more buildings by fire walls of less than four hour fire resistance rating without openings.

5. For public school state funded construction projects see Section 903.2.19.

6. For public school campuses: Kindergarten through 12th grade, see section 903.2.20

903.2.11.6 Other required suppression systems.
In addition to the requirements of Section 903.2, the provisions indicated in Table 903.2.11.6 also require the installation of a fire suppression system for certain buildings and areas.

903.2.19 Public school state funded construction projects for kindergarten through 12th grade — automatic sprinkler system requirements.

903.2.19.1 New public school campus. *An automatic sprinkler system shall be provided in all occupancies. The provisions of this section shall apply to any public school project consisting of one or more buildings on a new school campus and receiving state funds pursuant to Leroy F. Greene School Facilities Act of 1998, California Education Code sections 17070.10 through 17079. For purposes of this section, new campus refers to a school site, where an application for construction of original buildings was made to DSA on or after July 1, 2002.*

An automatic fire sprinkler system is not required in locations identified in Section 903.2.20

~~***Exceptions:***~~

~~*1. A relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. Also see CCR, Title 24, Part 1, California Administrative Code, Section 4-314 for definition of relocatable building.*~~

~~*2. Detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:*~~

~~*Concession Stand*~~
~~*Press Box*~~
~~*Restroom Facilities*~~
~~*Shade Structure*~~
~~*Snack Bar*~~
~~*Storage Building*~~
~~*Ticket Booth*~~

903.2.20 Public School Campuses. An automatic fire sprinkler system is not required to be provided in the following locations on Kindergarten through 12th grade.

1. A relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. Also see CCR, Title 24, Part 1, California Administrative Code, Section 4-314 for definition of relocatable building.

2. Detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:

Concession Stand
Press Box
Restroom Facilities
Shade Structure
Snack Bar
Storage Building
Ticket Booth

907.2.3 Group E. An ~~manual~~ *and automatic* fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies *with an occupant load of 50 or more persons or containing more than one classroom or one or more rooms used for Group E or I-4 day care purposes in accordance with this section.* When automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system. *One additional manual fire alarm box shall be located at the administration office or location approved by the AHJ.*

Exceptions:

~~*1.* Emergency voice/alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group E occupancies with occupant loads of 100 or less, provided that activation of the manual fire alarm system initiates an approved occupant notification signal in accordance with Section 907.5.~~
~~*2.* Manual fire alarm boxes are not required in Group E occupancies where all of the following apply:~~

~~*2.1.* Interior corridors are protected by smoke detectors.~~

~~*2.2.* Auditoriums, cafeterias, gymnasiums and similar areas are protected by heat detectors or other approved detection devices.~~

~~*2.3.* Shops and laboratories involving dusts or vapors are protected by heat detectors or other approved detection devices.~~

~~*3*. Manual fire alarm boxes shall not be required in Group E occupancies where all of the following apply:~~

~~*3.1*. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.~~

~~*3.2*. The emergency voice/alarm communication system will activate on sprinkler water flow.~~

~~*3.3*. Manual activation is provided from a normally occupied location.~~
~~*3.4. The capability to activate the evacuation signal from a central point is provided*.~~

1~~4~~. For public school state funded construction projects see Section 907.2.29.

2. For public schools see Section 907.2.3.7

3. For private schools see Section 907.2.3.8

907.2.3.7 Public School Campuses. An automatic fire alarm system in compliance with section 907.2.3 shall be provided in new buildings for all occupancies on Kindergarten through 12th grade public school campuses.

Exceptions:

1. A manual fire alarm system may be provided for a relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. Also see CCR, Title 24, Part 1, California Administrative Code, Section 4-314 for definition of relocatable building.

2. A fire alarm system is not required for detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:

Concession Stand
Press Box
Restroom Facilities
Shade Structure
Snack Bar
Storage Building
Ticket Booth

907.2.3.~~7~~8 Private schools. *An automatic fire alarm system shall be provided in new buildings of private schools.*

Exception: *Automatic detection devices are not required where an approved automatic sprinkler system is installed in accordance with Section 903.3.1.1 and the occupant*

notification appliances will activate on sprinkler water flow and manual activation is provided from a normally occupied location.

907.2.3.~~8~~9 Day-care, Group E.

907.2.3.~~8~~9.1 *An automatic fire alarm system shall be provided in all buildings used as or containing a Group E day-care.*

Exception: *Automatic detection devices are not required where an approved automatic sprinkler system is installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate on sprinkler water flow and manual activation is provided from a normally occupied location.*

907.2.3.~~8~~9.2 *Smoke detectors shall be installed in every room used for sleeping or napping.*

907.2.3.10 Day-care, Group E or Group I-4 located on a public school campus*. An automatic fire alarm system shall be provided in all buildings used as or containing a Group E or Group I-4 day-care.*

907.2.29 Public school state funded construction projects for kindergarten through 12th grade — automatic fire alarm system requirements.

~~907.2.29.1 New public school campus.~~ *~~An automatic fire alarm system shall be provided in all occupancies that activates the occupant notification system signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6. The provisions of this section shall apply to any public school project consisting of one or more buildings on a new school campus and receiving state funds pursuant to Leroy F. Greene School Facilities Act of 1998, California Education Code sections 17070.10 through 17079. For purposes of this section, new campus refers to a school site, where an application for construction of original buildings was made to DSA on or after July 1, 2002.~~*

~~Exceptions:~~

~~1. A relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. Also see CCR, Title 24, Part 1, California Administrative Code, Section 4-314 for definition of relocatable building.~~
~~2. Detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:~~

~~Concession Stand~~
~~Press Box~~
~~Restroom Facilities~~
~~Shade Structure~~
~~Snack Bar~~
~~Storage Building~~
~~Ticket Booth~~

~~3. Emergency voice/alarm communication systems meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall not be required in Group E occupancies with occupant loads of 100 or less, provided that activation of the manual fire alarm system initiates an approved occupant notification signal in accordance with Section 907.5.~~

~~907.2.29.2 New building on an existing public school campus.~~ *~~An automatic fire alarm system shall be provided in all occupancies. The provisions of this section shall apply to any public school project construction of a new building on an existing campus and receiving state funds~~*

~~*pursuant to Leroy F. Green, School Facilities Act of 1998, California Education Code sections 17070.10 through 17079. For purposes of this section, an existing campus refers to a school site, where an application for construction of original buildings was made to DSA prior to July 1, 2002.*~~

~~***Exceptions:***~~

~~*1. A construction project that has an estimated total cost of less than $200,000.*~~

~~*2. A relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. See California Administrative Code, Section 4-314 for definition of relocatable building.*~~

~~*3. Detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:*~~

~~*Concession Stand*~~
~~*Press Box*~~
~~*Restroom Facilities*~~
~~*Shade Structure*~~
~~*Snack Bar*~~
~~*Storage Building*~~
~~*Ticket Booth*~~

907.2.29.3~~1~~ 1 Alterations to existing buildings on an existing public school campus. *An automatic fire alarm system shall be provided for all portions within the scope of an alteration project. The provisions of this section shall apply to any public school project on an existing campus and receiving state funds pursuant to Leroy F. Green, School Facilities Act of 1998, California Education Code sections 17070.10 through 17079. For purposes of this section, an existing campus refers to a school site, where an application for construction of original buildings was made to DSA prior to July 1, 2002.*

Exceptions:

1. A manual fire alarm system may be provided for a construction project that has an estimated total cost of less than $200,000.

2. A manual fire alarm system may be provided for a relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. See California Administrative Code, Section 4-314 for definition of relocatable building.

3. A fire alarm system is not required for d~~D~~etached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:

Storage Building
Ticket Booth
Concession Stand
Snack Bar
Restroom Facilities
Shade Structure
Press Box

~~***907.2.29.4 Day-care, Group E or Group I-4 located on a public school campus****. An automatic fire alarm system shall be provided in all buildings used as or containing a Group E or Group I-4 day-care.*~~

907.6.6.2 Termination of monitoring service. Termination of fire alarm monitoring services shall be in accordance with Section 901.9.

907.6.6.3 Group E schools. *Automatic f~~F~~ire alarm systems shall be monitored and shall transmit the alarm, supervisory and trouble signals to an approved supervising station in accordance with NFPA 72. The supervising station shall be listed as either UUFX (central station) or UUJS (remote & proprietary) by the Underwriters Laboratory Inc. (UL) or other approved listing and testing laboratory or shall comply with the requirements of FM 3011. Termination of monitoring services shall be in accordance with Section 907.6.5.2.*

[Item 6. Energy Storage Systems]

SECTION 202 DEFINITIONS

BATTERY TYPES.

~~**Lithium-ion** **Flow battery**~~. *A type of storage battery* ~~that consists~~ *which includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of* ~~*lithium ions embedded*~~ *electrical current, occurs through the membrane while both liquids circulate in* ~~*a carbon graphite or nickel metal-oxide substrate*~~ *their own respective space*. ~~The electrolyte is a carbonate mixture or a gelled polymer. The lithium ions are the charge carriers of the battery.~~

~~Lithium metal polymer~~ **Lead acid battery**. A storage battery that is comprised of ~~nonaqueous~~ *lead electrodes immersed in sulphuric acid electrolyte.*

Lithium-ion battery. *A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with an inorganic salt and can be in a liquid or a gelled polymer form. Lithiated metal oxide is typically a cathode and forms of carbon or* ~~polymerized electrolytes, which provide ionic conductivity between lithiated positive active material electrically separated from metallic~~ *graphite typically from the anode.*

Lithium metal polymer battery. *A storage battery that is similar to the lithium ion battery except that it has a lithium metal anode in the place of the traditional carbon or* ~~lithiated negative active material~~ *graphite anode*.

Nickel cadmium (Ni-Cd) battery. *An alkaline storage battery in which the positive active material is nickel oxide, the negative contains cadmium and the electrolyte is potassium hydroxide.*

~~**Nonrecombinant**~~ ***Pre-engineered stationary storage battery system.*** *An energy storage system consisting of batteries, a battery management system, components and modules that are produced in a factory, designed to comprise the system when assembled and shipped to the job site for assembly.*

Prepackaged stationary storage battery system. *An energy storage system consisting of batteries, a battery management system, components and modules that is factory assembled and shipped as a complete unit for installation at the job site.*

Sodium-beta storage battery. *A storage battery is also referred to as Na-beta batteries or NBBs which*~~, under conditions of normal use, hydrogen~~ *uses a solid beta-alumina electrolyte membrane that selectively allows sodium ion transport between a positive electrode such as metal halide and* ~~oxygen gasses created by electrolysis are vented into the air outside of the battery~~ a negative sodium electrode.

~~**Recombinant battery**. A storage battery in which, under conditions of normal use, hydrogen and oxygen gases created by electrolysis are converted back into water inside the battery instead of venting into the air outside of the battery.~~

Stationary storage battery. *A group of electrochemical cells interconnected to supply a nominal voltage of DC power to a suitably connected electrical load, designed for service in a permanent location.* ~~The number of cells connected in a series determines the nominal voltage rating of the battery. The size of the cells determines the discharge capacity of the entire battery. After discharge, it may be restored to a fully charged condition by an electric current flowing in a direction opposite to the flow of current when the battery is discharged.~~

~~**Valve-regulated lead-acid(VRLA) battery.** A lead-acid battery consisting of sealed cells furnished with a valve that opens to vent the battery whenever the internal pressure of the battery exceeds the ambient pressure by a set amount. In VRLA batteries, the liquid electrolyte in the cells is immobilized in an absorptive glass mat (AGM cells or batteries) or by the addition of a gelling agent (gel cells or gelled batteries).~~

~~**Vented(flooded)lead-acid battery**. A lead-acid battery consisting of cells that have electrodes immersed in liquid electrolyte. Flooded lead-acid batteries have a provision for the user to add water to the cell and are equipped with a flame-arresting vent which permits the escape of hydrogen and oxygen gas from the cell in a diffused manner such that a spark, or other ignition source, outside the cell will not ignite the gases inside the cell.~~

Delete without substitution:

~~**202 BATTERYSYSTEM,STATIONARY LEAD ACID.** A system which consists of three interconnected subsystems:~~

~~1. A lead-acid battery.~~

~~2. A battery charger.~~

~~3. A collection of rectifiers, inverters, converters and associated electrical equipment as required for a particular application.~~

Add new definition as follows:

BATTERY SYSTEM, STATIONARY STORAGE. *A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls, and associated electrical equipment designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.*

ENERGY MANAGEMENT SYSTEM. *An electronic system protects stationary storage batteries from operating outside its safe operating parameters, and generates alarm and trouble for off normal conditions.*

STATIONARY BATTERY ARRAY*–An arrangement of individual stationary storage batteries in close proximity to each other, mounted on storage racks or in modules, battery cabinets or other enclosures.*

Revise as follows:

[A] ***105.7.2 Battery systems.*** *A construction permit is required to install stationary storage battery systems* ~~having a liquid capacity of more than 50 gallons (189 L)~~ *regulated by Section 608.*

602.1 Definitions. The following terms are defined in Chapter 2:

BATTERY SYSTEM, STATIONARY ~~**LEAD-ACID**~~ ***STORAGE*****. BATTERY TYPES.**

COMMERCIAL COOKING APPLIANCES.

CRITICAL CIRCUIT.

EMERGENCY POWER SYSTEM.
HOOD.
Type I. Type II.
REFRIGERANT.
REFRIGERATION SYSTEM.
STANDBY POWER SYSTEM.

SECTION 608 STATIONARY STORAGE BATTERY SYSTEMS

[Note: The existing Section 608.1 through 608.9 are

to be deleted.]

Delete and substitute as follows:

608.1 Scope. *~~Stationary storage battery systems having an electrolyte capacity of more than 50 gallons (189 L) for flooded~~ ~~lead-acid, nickel cadmium (Ni-Cd) and valve-regulated lead-acid (VRLA), or more than 1,000 pounds (454 kg) for lithium-ion and lithium metal polymer, used for facility standby power, emergency power or uninterruptible power supplies shall comply with~~ this section and Table 608.1.~~*

Stationary storage battery systems having capacities exceeding the values shown in Table 608.1 shall comply with Section 608.1.2 through 608.6.6, as applicable.

TABLE 608.1 BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.

BATTERY TECHNOLOGY	***CAPACITY[a]***
Lead acid, all types	*70 KWh (252 Megajoules)*
Nickel cadmium (Ni-Cd)	*70 KWh (252 Megajoules)*
Lithium, all types	*20 KWh (72 Megajoules)*
Sodium, all types	*20 KWh (72 Megajoules)[c]*
Flow batteries [b]	*20 KWh (72 Megajoules)*
Other batter technologies	*10 KWh (36 Megajoules)*

a. For batteries rated in Amp-Hours, KWh shall equal rated voltage times amp-hour rating divided by 1000

b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte type technologies

c. 70 KWh (252 Mega joules) for sodium-ion technologies

608.1.1 Permits. *Permits shall be obtained for the installation and operation of stationary storage battery systems in accordance with Section 105.7.2.*

608.1.2 Construction documents. *The following information shall be provided with the permit application:*

1. *Location and layout diagram of the room in which the stationary storage battery system is to be installed*
2. *Details on hourly fire-resistant rated assemblies provided*
3. *Quantities and types of storage batteries and battery systems.*
4. *Manufacturer's specifications, ratings and listings of storage batteries and battery systems*
5. *Details on energy management systems*
6. *Location and content of signage*
7. *Details on fire suppression, smoke detection and ventilation systems.*
8. *Rack storage arrangement, including seismic support criteria.*

608.1.3 Hazard mitigation analysis*. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:*

1. *Battery technologies not specifically identified in Table 608.1 are provided.*

2. *More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.*
3. *When allowed as a basis for increasing maximum allowable quantities. See 608.3.*

608.1.3.1 Fault condition. *The hazard mitigation analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the fire code official. Only single failure modes shall be considered.*

1. *Thermal runaway condition in a single battery storage rack, module or array.*
2. *Failure of any energy management system.*
3. *Failure of any required ventilation system.*
4. *Voltage surges on the primary electric supply.*
5. *Short circuits on the load side of the stationary battery storage system.*
6. *Failure of the smoke detection, fire suppression, or gas detection system.*
7. *Spill neutralization not being provided or failure of the secondary containment system.*

608.1.3.2 Analysis approval. *The fire code official is authorized to approve the hazardous mitigation analysis provided the consequences of the hazard mitigation analysis demonstrate:*

1. *Fires or explosions will be contained within unoccupied battery storage rooms for the minimum duration of the fire resistance rated walls identified in lBC table 509.1.*
2. *Fires and explosions in battery cabinets in occupied work centers will be detected in time to allow occupants within the room to safely evacuate.*
3. *Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in access of lDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.*
4. *Flammable gases released from batteries during charging, discharging and normal operation shall not exceed 25% of their lower flammability limit (LFL).*
5. *Flammable gases released from batteries during fire, overcharging and other abnormal conditions shall not create an explosion hazard that will injure occupants or emergency responders.*

608.1.3.3 *Additional protection measures. Construction, equipment and systems that are required for the stationary storage battery system to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 608.1, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.*

608.1.4 Seismic and structural design. *Stationary storage battery systems shall comply with the seismic design requirements in Chapter 16 of the California Building Code, and shall not exceed the floor loading limitation of the building.*

608.1.5 Vehicle impact protection*. Where stationary storage battery systems are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.*

608.1.6 Combustible storage*. Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 608.2.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.*

608.1..6 Combustible storage*. Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 608.2.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.*

608.1.7 Testing, maintenance and repairs. *Storage batteries and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any storage batteries or system components used to replace existing units shall be compatible with the battery charger, energy management systems, other storage batteries, and other safety systems. Introducing other types of storage batteries into the stationary storage battery system, or other types*

of electrolytes into flow battery systems shall be treated as a new installation and require approval by the fire code official before the replacements are introduced into service.

608.2 Location and construction. *Rooms and areas containing stationary storage battery systems shall be designed, located and constructed in accordance with this section.*

608.2.1 Location. *Stationary storage battery systems shall not be located in areas where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.*

Exceptions:

1. *Lead acid and nickel cadmium stationary storage battery systems.*
2. *Installations on noncombustible rooftops of buildings exceeding 75 feet (22 860 mm) in height that do not obstruct fire department rooftop operations shall be permitted where approved by the fire code official.*

608.2.2 Separation. *Rooms containing stationary storage battery systems shall be separated from other areas of the building in accordance with Section 509.1 of the International Building Code. Battery systems shall be allowed to be in the same room with the equipment they support.*

608.2.3 Stationary battery arrays. *Storage batteries, prepackaged stationary storage battery systems and pre-engineered stationary storage battery systems shall be segregated into stationary battery arrays not exceeding 50 KWh (180 Mega joules) each. Each stationary battery array shall be spaced a minimum three feet (914 mm) from other stationary battery arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.*

Exceptions:

1. *Lead acid and nickel cadmium storage battery arrays.*
2. *Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 250 KWh (900 Mega joules) each.*
3. *The fire code official is authorized to approve listed pre-engineered and prepackaged battery arrays with larger capacities or smaller battery array spacing if large scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire resistance rating of the room separation specified in Table 509 of the California Building Code*

608.2.4 Separate rooms. *Where stationary batteries are installed in a separate equipment room accessible only to authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.*

608.2.5 Occupied work centers. *Where stationary storage batteries are located in an occupied work center, they shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.*

608.2.5.1 Cabinets. *Where stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.*

608.2.6 Signage. *Approved signs shall be provided on doors or in locations near entrances to stationary storage battery system rooms and shall include the following or equivalent.*

1. *The room contains energized battery systems.*

2. The room contains energized electrical circuits.
3. The additional markings required in Section 608.6 for the types of storage batteries contained within the room.

Exception: *Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.*

608.2.6.1 ***Electrical disconnects.*** *Where the stationary storage battery system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.*

608.2.6.2 ***Cabinet signage.*** *Battery storage cabinets provided in occupied work centers in accordance with Section 608.2.5 shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. There shall be signs within the cabinet that indicate the relevant electrical, chemical and hazards, as required by Section 608.6*

608.2.7 ***Outdoor installations.*** *Stationary storage battery systems located outdoors shall comply with this Section, in addition to all applicable requirements of Section 608. Installations in outdoor enclosures or containers which can be occupied for servicing, testing, maintenance and other functions shall be treated as battery storage rooms.*

Exception: *Stationary battery arrays in noncombustible containers shall not be required to be spaced three feet (914 mm) from the container walls.*

608.2.7.1 ***Separation.*** *Stationary storage battery systems located outdoors shall be separated by a minimum five feet (1524 mm) from the following:*

1. *Lot lines*
2. *Public ways*
3. *Buildings*
4. *Stored combustible materials*
5. *Hazardous materials*
6. *High-piled stock*
7. *Other exposure hazards*

Exception: *The fire code official is authorized to approve smaller separation distances if large scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.*

608.2.7.2 ***Means of egress.*** *Stationary storage battery systems located outdoors shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).*
Exception: The fire code official is authorized to approve smaller separation distances if large scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

608.2.7.3 ***Security of outdoor areas****. Outdoor areas in which stationary storage battery systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.*

608.2.7.4 ***Walk-in units*** *Where a stationary storage battery system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of batteries and electronics, and shall not be occupied for other purposes.*

608.3 Maximum allowable quantities. *Fire areas within buildings containing stationary storage batteries systems exceeding the maximum allowable quantities in Table 608.3 shall comply with all applicable High Hazard Group H occupancy requirements in this code and the California Building Code.*

Exception: *Where approved by the fire code official, areas containing stationary storage batteries that exceed the amounts in Table 608.3 shall be permitted to be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with 608.1.3 and large scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.*

TABLE 608.3 MAXIMUM ALLOWABLE BATTERY QUANTITIES

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES[a]	GROUP H OCCUPANCY
Lead acid, all types	unlimited	Not Applicable
Nickel cadmium (Ni-Cd),	unlimited	Not Applicable
Lithium, all types	600 KWh	Group H-2
Sodium, all types	600 KWh	Group H-2
Flow batteries [b]	600 KWh	Group H-2
Other battery technologies	200 KWh	Group H-2 [c]

a. For batteries rated in Amp-Hours, Watt-hours (Wh) shall equal rated battery voltage times the Amp-hour rating divided by 1000

b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte type technologies

c. Shall be a Group H-4 occupancy if the fire code official determines that a fire or thermal runaway involving the battery technology does not represent a significant fire hazard

608.3.1 Mixed battery systems. *Where areas within buildings contain different types of storage battery technologies, the total aggregate quantities of batteries shall be determined based on the sum of percentages of each battery type quantity divided by the maximum allowable quantity of each battery type. If the sum of the percentages exceeds 100%, the area shall be treated as a high-hazard Group H occupancy in accordance with Table 608.3.*

608.4 Storage batteries and equipment. *The design and installation of storage batteries and related equipment shall comply with this sections 608.4.1 through 608.4.8.*

608.4.1 Listings. *Storage batteries and battery storage systems shall comply with all of the following:*

1. *Storage batteries shall be listed in accordance with UL 1973.*
2. *Prepackaged and pre-engineered stationary storage battery systems shall be listed in accordance with UL 9540.*

Exception: *Lead-acid batteries are not required to be listed.*

608.4.2 Prepackaged and pre-engineered systems. *Prepackaged and pre-engineered stationary storage battery systems shall be installed in accordance with their listing and the manufacturer's instructions.*

608.4.3 Energy management system. *An approved energy management system shall be provided for battery technologies other than lead acid and nickel cadmium for monitoring and balancing cell voltages, currents and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, overvoltage (overcharge) or under voltage (over discharge) are detected.*

608.4.4 ***Battery chargers.*** *Battery chargers shall be compatible with the battery chemistry and the manufacturer's electrical ratings and charging specifications. Battery chargers shall be listed and labeled in accordance with the UL 1564 or provided as part of a listed pre-engineered or prepackaged stationary storage battery system.*

608.4.5 ***Inverters.*** *Inverters shall be listed and labeled in accordance with UL 1741. Only inverters listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.*

608.4.6 ***Safety caps.*** *Vented batteries shall be provided with flame-arresting safety caps.*

608.4.7 ***Thermal runaway.*** *Where required by Section 608.6 storage batteries shall be provided with a listed device or other approved method to prevent, detect and control thermal runaway.*

608.4.8 ***Toxic and highly toxic gas. Stationary storage battery systems that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall comply with Chapter 60.***

608.5 ***Suppression and detection systems.*** *Suppression and detection systems shall be provided in accordance with Sections 608.5.1 through 608.5.5.*

608.5.1 *Fire suppression systems. Rooms containing stationary storage battery systems shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13. If the storage battery types are not addressed in Chapter 5 of NFPA 13, the fire code official is authorized to approve the fire suppression system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.*

Exception: *Spaces or areas containing stationary storage battery systems used exclusively for telecommunications equipment in accordance with Section 903.2.*

608.5.1.1 Alternative suppression systems. *Battery systems that utilize water reactive materials shall be protected by an approved alternative automatic fire- extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of storage batteries in the room. The fire code official shall be permitted to approve the alternate fire suppression system based on full scale fire and fault condition testing conducted or witnessed and reported by an approved laboratory.*

608.5.2 ***Smoke detection system.*** *An approved automatic smoke detection system shall be installed in rooms containing stationary storage battery systems in accordance with Section 907.2.*

608.5.3 ***Ventilation.*** *Where required by Section 608.6 or Section 608.1.3, ventilation of rooms containing stationary storage battery systems shall be provided in accordance with the California Mechanical Code and the following:*

1. *The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25% of the lower flammability limit, or for hydrogen 1.0 percent of the total volume of the room; or*
2. *Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [0.00508 m3/(s • m2)] of floor area, but not less than 150 cfm (4 m3/min).*
3. *The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the ceiling for gases having a vapor density less than air.*

608.5.3.1 ***Cabinet ventilation.*** *Where cabinets located in occupied spaces contain the storage batteries that are required by Section 608.6 or 608.1.3 to be provided with ventilation, the cabinet shall be provided with ventilation in accordance with Section 608.5.3.*

608.5.3.2 ***Supervision.*** *Required mechanical ventilation systems for rooms and cabinets*

containing storage batteries shall be supervised by an approved central station, proprietary or remote station service or shall initiate an audible and visual signal at an approved constantly attended on-site location.

608.5.4 Gas detection system. *Where required by Section 608.6 or 608.1.3, rooms containing stationary storage battery systems shall be protected by a continuous gas detection system complying with Section 916. The gas detection system shall be designed to activate where the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL), or where the level of toxic or highly toxic gas exceeds ½ of the IDLH.*

608.5.4.1 System activation. *Activation of the gas detection system shall result in all the following:*

1. *Initiation of distinct audible and visible alarms in the battery storage room.*
2. *Transmission of an alarm to an approved location.*
3. *De-energizing of the battery charger.*
4. *Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system.*

Exception: *Lead acid and nickel cadmium stationary storage battery systems shall not be required to comply with items 1, 2, and 3 above.*

608.5.5 Spill control and neutralization. *Where required by Section 608.6, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing stationary storage batteries as follows:*

1. *For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.*
2. *For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.*

608.6 Specific battery type requirements. *This section includes requirements applicable to specific types of storage batteries. Stationary storage battery systems with more than one type of storage battery shall comply with requirements applicable to each battery type.*

608.6.1 Lead acid storage batteries. *Stationary battery systems utilizing lead acid storage batteries shall comply with the following:*

1. *Ventilation shall be provided in accordance with Section 608.5.3.*
2. *Spill control and neutralization shall be in accordance with Section 608.5.5.*
3. *Thermal runaway protection shall be provided for VRLA storage batteries in accordance with Section 608.4.7.*
4. *The signage in Section 608.2.6 shall also indicate the room contains Lead Acid batteries.*

608.6.2 Nickel cadmium(Ni-Cd) storage batteries. *Stationary battery systems utilizing nickel cadmium (Ni-Cd) storage batteries shall comply with the following:*

1. *Ventilation shall be provided in accordance with Section 608.5.3.*
2. *Spill control and neutralization shall be in accordance with Section 608.5.5.*
3. *Thermal runaway protection shall be provided for valve regulated sealed nickel cadmium storage batteries in accordance with Section 608.4.7.*
4. *The signage in Section 608.2.6 shall also indicate the room contains nickel cadmium batteries.*

608.6.3 Lithium-ion storage batteries*. The signage in Section 608.2.6 shall also indicate the type of lithium batteries contained in the room.*

608.6.4 Sodium beta storage batteries. *Stationary battery systems utilizing sodium beta*

storage batteries shall comply with the following:

1. *Ventilation shall be provided in accordance with Section 608.5.3.*
2. *The signage in Section 608.2.6 shall also indicate the type of sodium batteries in the room and APPLY NO WATER.*

608.6.5 Flow batteries. *Stationary battery systems utilizing flow batteries shall comply with the following:*

1. *Ventilation shall be provided in accordance with Section 608.5.3.*
2. *Spill control and neutralization shall be in accordance with Section 608.5.5.*

608.6.6 Other battery technologies*. Stationary battery systems utilizing battery technologies other than those described in Sections 608.6.1 through 608.6.5 shall comply with the following:*

1. *Gas detection systems complying with Section 916 shall be provided in accordance with Section 608.5.4 where the batteries have the potential to produce toxic or highly toxic gas in the storage room or cabinet in excess of the permissible exposure limits (PEL) during charging, discharging and normal system operation.*
2. *Mechanical ventilation shall be provided in accordance with Section 608.5.3.*
3. *Spill control and neutralization shall be in accordance with Section 608.5.5.*
4. *In addition to the signage required in Section 608.2.6, the marking shall identify the type of batteries present, describe the potential hazards associated with the battery type, and indicate the room contains energized electrical circuits.*

Revise as follows:

907.2.23 Battery rooms. *An automatic smoke detection system shall be installed in areas containing stationary storage battery systems ~~with a liquid capacity of more than 50 gallons (189 L)~~ as required in Section 608.*

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 7. Underground petroleum tanks within the definition of the Aboveground Petroleum Storage Act for the changes made by SB 612]

SECTION 202
DEFINITIONS

TANK IN AN UNDERGROUND AREA. *A tank located in a structure that is at least 10 percent below the ground surface, including, but not limited to, a basement, cellar, shaft, pit, or vault.*

Note: *A tank in an underground area shall have the same meaning as defined in Health and Safety Code Section 25270.2(o)(1) for the applications specified in Sections 2306.6.2.7, 5703.4.1 and 5703.6.2.2.*

Exceptions:
1. A pressure vessel or boiler that is subject to Labor Code, Division 5, Part 6 (commencing with Section 7620).
2. A tank containing hazardous waste or extremely hazardous waste, as respectively defined in Health and Safety Code Sections 25117 and 25115, if the Department of Toxic Substances Control has issued the person owning or operating the tank a hazardous waste facilities permit for the tank.

3. An aboveground oil production tank that is subject to Public Resources Code Section 3106.
4. Oil-filled electrical equipment, including but not limited to, transformers, circuit breakers, or capacitors, if the oil-filled electrical equipment meets either of the following conditions:
a. The equipment contains less than 10,000 gallons of dielectric fluid.
b. The equipment contains 10,000 gallons or more of dielectric fluid with polychlorinated biphenyl levels less than 50 parts per million, appropriate containment or diversionary structures or equipment are employed to prevent discharged oil from reaching a navigable water course, and the electrical equipment is visually inspected in accordance with the usual routine maintenance procedures of the owner or operator.
5. A tank regulated as an underground storage tank under Health and Safety Code Division 20, Chapter 6.7 (commencing with Section 25280) and the California Code of Regulations, Title 23, Division 3, Chapter 16 (commencing with Section 2610) and that does not meet the definition of a tank in an underground area.
6. A transportation-related tank facility, subject to the authority and control of the United States Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the United States Environmental Protection Agency, as set forth in the Code of Federal Regulations, Title 40, Chapter I, Subchapter D, Part 112 (commencing with Section 112.1).
7. A tank or tank facility located on and operated by a farm that is exempt from the federal spill, prevention, control, and countermeasure rule requirements pursuant to the Code of Federal Regulations, Title 40, Chapter I, Subchapter D, Part 112 (commencing with Section 112.1).

2302.1 Definitions. The following terms are defined in Chapter 2:
AIRCRAFT MOTOR-VEHICLE FUEL-DISPENING FACILITY.
ALCOHOL-BLENDED FUELS.
AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.
DISPENSING DEVICE, OVERHEAD TYPE.
FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.
LIQUEFIED NATURAL GAS (LNG).
MARINE MOTOR FUEL-DISPENSING FACILITY.
TANK IN AN UNDERGROUND AREA.

2306.6.2 Piping, valves, fittings and ancillary equipment for above-ground tanks for Class I, II and III liquids. Piping, valves, fittings and ancillary equipment for above-ground tanks storing Class I, II and III liquids shall comply with Sections 2306.6.2.1 through 2306.6.2.~~6~~*7*.

2306.6.2.7 Piping for tanks in underground areas. *Piping systems connected to a tank in an underground area shall also comply with Section 5703.6.2.2.*

5702.1 Definitions. The following terms are defined in Chapter 2.
ALCOHOL-BASED HAND RUB.
BULK PLANT OR TERMINAL.
BULK TRANSFER.
COMBUSTIBLE LIQUID.
Class II.
Class IIIA.
Class IIIB.
FIRE POINT.
FLAMMABLE LIQUID.
Class IA.
Class IB.
Class IC.
FLASH POINT.
FUEL LIMIT SWITCH.
LIQUID STORAGE ROOM.
LIQUID STORAGE WAREHOUSE.
MOBILE FUELING.
PROCESS TRANSFER.

REFINERY.
REMOTE EMERGENCY SHUTOFF DEVICE.
REMOTE SOLVENT RESERVOIR.
SOLVENT DISTILLATION UNIT.
TANK, PRIMARY.
TANK IN AN UNDERGROUND AREA.

5703.4.1 Spill control and secondary containment for tanks in underground areas.
Tanks in underground areas and associated piping systems shall be provided with spill control and secondary containment that are designed and constructed as outlined in Section 5004.2, except as modified by Section 5703.6.2.2.

5703.6.2 Design and fabrication of piping systems and components. Piping system components shall be designed and fabricated in accordance with the applicable standard listed in Table 5703.6.2 and Chapter 27 of NFPA 30, except as modified by Section*s* 5703.6.2.1 *and 5703.6.2.2*.

5703.6.2.2 Below-grade or underground piping systems connected to a tank in an underground area. *Below-grade or underground piping systems that are connected to a tank in an underground area shall have secondary containment. The building, room or area in which the flammable or combustible liquid is stored or located may be used as secondary containment if it meets the containment and drainage methods as described in Section 5004.2.2.1.*

All portions of below-grade and underground piping systems shall be monitored for leaks by one of the following methods:

1. A listed or approved leak detection system that either activates an audible and visual alarm or stops the flow of product when a leak is detected.
2. Direct visual inspection conducted monthly by designated personnel.
3. Indirect visual inspection conducted monthly through the use of, but not limited to, mirrors, cameras or video equipment.
4. If the above methods cannot be met, an alternative means shall be provided in accordance with Section 1.11.2.4.

Exceptions:
1. Piping systems connected to a tank in an underground area that is used solely in connection with a fire pump or emergency system, legally required standby system, or optional standby system as specified in Health and Safety Code Section 25270.2(o)(1)(C)(iii).
2. Piping systems connected to a tank in an underground area that contains petroleum to be used or previously used as a lubricant or coolant in a motor engine or transmission or oil-filled operational equipment or oil-filled manufacturing equipment, as described in Health and Safety Code Section 25270.2(o)(1)(C)(i).
3. Piping systems connected to a petroleum hazardous waste tank in an underground area that complies with the hazardous waste tank standards pursuant to the California Code of Regulations, Title 22, Chapter 15, Article 10 (commencing with Section 66265.190), and the facility has been issued a unified program facility permit pursuant to Health and Safety Code Section 25404.2 for generation, treatment, accumulation, or storage of hazardous waste, as described in Health and Safety Code Section 25270.2(o)(1)(C)(ii).

5704.2.7.4 Emergency venting. Stationary, aboveground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents for Class I, II and IIIA liquids shall not discharge inside buildings. The venting shall be installed and maintained in accordance with Section 22.7 of NFPA 30*, except as modified by Section 5703.6.2.2*.

Exceptions:
1. Tanks larger than 12,000 gallons (45 420 L) in capacity storing Class IIIB liquids that are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting.

2. Emergency vents on protected above-ground tanks complying with UL 2085 containing Class II or IIIA liquids are allowed to discharge inside the building.

Notation

Authority: Health and Safety Code Section 13108, 13143.9, 13146, 18949.2, and 25270.4.1(a)
Reference(s): Health and Safety Code Section 25270.2(a) and (o)

[Item 8. Photovoltaic systems modifications]

605.11 Solar photovoltaic power systems. Solar photovoltaic power systems shall be installed in accordance with Sections 605.11.1 through 605.11.2, the *California Building Code* or *California Residential Code*, and NFPA 70.

Add new text as follows:

605.11.1.2.1 Pathways to ridge. *A minimum of two 36 in. (914 mm) wide pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. At least one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, at least one 36 in. (914 mm) wide pathway from lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, or on an adjacent roof plane, or straddling the same and adjacent roof planes.*

605.11.1.2.2 Setbacks at ridge. *For photovoltaic arrays occupying 33 percent or less of the plan view total roof area, a minimum 18 in. (457 mm) wide setback is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, a minimum 36 in. (457 mm) wide setback is required on both sides of a horizontal ridge.*

605.11.1.2.2.1 Alternative setbacks at ridge. *Where an automatic sprinkler system is installed within the dwelling in accordance with NFPA 13D, setbacks at ridge shall conform with one of the following:*

1. For photovoltaic arrays occupying 66 percent or less of the plan view total roof area, a minimum 18 in. (457 mm) wide setback is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, a minimum 36 in. (914 mm) wide setback is required on both sides of a horizontal ridge.

Revise as follows:

~~**605.11.1.3**~~ ***605.11.3*** **Other than Group R-3 buildings.** Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections ~~605.11.1.3.1~~ *605.11.3.1* through ~~605.11.1.3.3~~ *605.11.3.3*.

Exception: *Where it is determined by the* ~~fire code official~~*fire code official* that the roof configuration is similar to that of a Group R-3 occupancy, the *fire code official shall be permitted to allow the residential* access and ventilation requirements in ~~Sections 605.11.1.2.1 through 605.11.1.2.5 shall be permitted~~ *Section 605.11.1.2* to be used.

~~605.11.1.3.1~~ ***605.11.3.1*** ~~**Access**~~ ***Perimeter pathways.*** There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: *Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum 4 foot wide (1290 mm).*

Delete and substitute as follows:

~~605.11.1.3.2~~ ***605.11.3.2*** ~~**Pathways**~~ ***Interior pathways.*** ~~The solar installation shall be designed to provide designated pathways. The pathways shall meet the following~~

~~requirements:~~

1. ~~The pathway shall be over areas capable of supporting fire fighters accessing the roof.~~
2. ~~The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting fire fighters accessing the roof.~~
3. ~~Pathways shall be a straight line not less than 4 feet (1290 mm) clear to roof standpipes or ventilation hatches.~~
4. ~~Pathways shall provide not less than 4 feet (1290 mm) clear around roof access hatch with not less than one singular pathway not less than 4 feet (1290 mm) clear to a parapet or roof edge.~~

Interior pathways shall be provided between array sections to meet the following requirements:

1. *Pathways shall be provided at intervals no greater than 150 ft (45. 7 m) throughout the length and width of the roof.*
2. *A minimum 4 ft (1290 mm) wide pathway in a straight line to roof standpipes or ventilation hatches.*
3. *A minimum 4 ft (1290 mm) wide pathway around roof access hatches with not less than at least one minimum 4 ft (1290 mm) wide pathway to a parapet or roof edge.*

Revise as follows:

~~605.11.1.3.3~~ ***605.11.3.3*** **Smoke ventilation.** The solar installation shall be designed to meet the following requirements:

1. ~~Arrays~~ *Where nongravity-operated smoke and heat vents occur, a minimum 4 ft (1219 mm) wide pathway* shall be ~~not greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations~~ *provided bordering all sides*.
2. *Smoke ventilation options between array sections shall be one of the following:*
2.1. A ~~pathway~~ *minimum* 8 ~~feet~~ ft (2438 mm) ~~or greater in width~~ *wide pathway*.
2.2. ~~A 4-foot (1290 mm) or greater in width pathway and bordering roof skylights or~~ Where gravity-operated dropout smoke and heat vents occur, a minimum 4 ft (1290 mm) wide pathway on not less than one side.
2.3. ~~. A 4-foot (1290 mm) or greater in width pathway and bordering all sides of nongravity-operated dropout smoke and heat vents.~~
2. 3. A *minimum* 4~~-foot~~ ft (1290 mm) ~~or greater in width~~ *wide* pathway ~~and~~ bordering 4-foot by 8-foot (1290 mm by 2438 mm) ~~"~~venting cutouts~~"~~ every 20 feet (6096 mm) on alternating sides of the pathway.

~~**605.11.2**~~ **605.11.4 Ground-mounted photovoltaic ~~arrays~~ *panel systems*.** Ground-mounted photovoltaic ~~arrays~~ *panel systems* shall comply with Section 605.11 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground-mounted photovoltaic arrays.

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 9. Plant Processing and Extraction]

CHAPTER 38

PLANT PROCESSING AND EXTRACTION FACILITIES

3801.1 Scope *Plant processing or extraction facilities shall comply with this chapter and the California Building Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material and production of the miscella, distillation of the solvent from the miscella and solvent recovery. The use, storage, transfilling, and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the California Building Code.*

3801.2 Existing buildings or facilities. *Existing buildings or facilities used for the processing of plants or where the medium of extraction or solvent is changed shall comply with this chapter.*

3801.3 Permits. *Permits shall be required as set forth in Section 105.6 and 105.7.*

SECTION 3802 DEFINITIONS

3802.1 Definitions *The following terms are defined in Chapter 2:*

DESOLVENTIZING
MISCELLA

SECTION 3803 PROCESSING AND EXTRACTION

3803.1 Construction. *Processing shall be located in a building complying with the California Building Code.*

3803.2 Prohibited occupancies. *Extraction processes utilizing flammable gasses or flammable cryogenic fluids shall not be located in any building containing a Group A, E, I or R occupancy.*

3803.3 Location. *The extraction equipment and extraction process utilizing hydrocarbon solvents shall be located in a room or area dedicated to extraction.*

3803.4 Post-process purification and winterization. *Post-processing and winterization involving the heating or pressurizing of the miscella to other than normal pressure or temperature shall be approved and performed in an appliance listed for such use. Domestic or commercial cooking appliances shall not be used.*

3803.5 Industrial ovens. *The use of industrial ovens shall comply with Chapter 30.*

3803.6 Use of flammable and combustible liquids. *The use of flammable and combustible liquids for liquid extraction processes where the liquid is boiled, distilled, or evaporated shall*

be located within a hazardous exhaust fume hood, rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres. Heating of flammable or combustible liquids over an open flame is prohibited.

Exception: *The use of a heating element not rated for flammable atmospheres approved where documentation from the manufacture or approved testing laboratory indicates is it rated for heating of flammable liquids.*

3803.7 Liquefied Petroleum Gas *Liquefied-petroleum gases shall not be released to the atmosphere.*

Exception: *LPG gas may be released to the atmosphere in accordance with NFPA 58 Section 7.3.*

SECTION 3804 SYSTEMS AND EQUIPMENT

3804.1 General requirements. *Systems and equipment used with the processing and extraction of oils and products from plants shall comply with Sections 3804.2 through 3804.4, 5003.2, other applicable provisions of this code, the California Building Code, and the California Mechanical Code.*

3804.2 Systems and equipment. *Systems or equipment used for the extraction of oils from plant material shall be listed or approved for the specific use. If the system used for extraction of oils and products from plant material is not listed, then the system shall be reviewed by a Registered Design Professional.*
The Registered Design Professional shall review and consider any information provided by the system's designer or manufacturer. For systems and equipment not listed for the specific use, a technical report in accordance with Section 3804.3 shall be prepared and submitted to the fire code official for review and approval. The firm or individual preparing the technical report shall be approved by the fire code official prior to performing the analysis.

3804.3 Technical report. *The technical report which has been reviewed and approved by the fire code official, as required by Section 3804.2 is required prior to the equipment being located or installed at the facility. The report shall be prepared by a Registered Design Professional or other professional approved by the fire code official.*

3804.3.1 Report Content. *The technical report shall contain all of the following:*

1. *Manufacturer information.*
2. *Preparer of record on technical report.*
3. *Date of review and report revision history.*
4. *Signature page shall include all of the following:*
   4.1.Author of the report
   4.2. Date of report
   4.3. Date and signature of Registered Design professional of record performing the design or peer review.

5. *Model number of the item evaluated. If the equipment is provided with a serial number, the serial number shall be included for verification at time of site inspection.*
6. *Methodology of the design or peer review process used to determine minimum safety requirements. Methodology shall consider the basis of design, and shall include a code analysis and code path to demonstrate the reason as to why specific code or standards are applicable or not.*
7. *Equipment description. A list of every component and sub-assembly (fittings, hose, quick disconnects, gauges, site glass, gaskets, valves, pumps, vessels, containers, switches, etc.) of the system or equipment, indicating the manufacturer, model number, material, and solvent compatibility. Manufacture' data sheets shall be provided.*
8. *A general flow schematic or general process flow diagram of the process. Post-processing or winterization may be included in this diagram. All primary components of the process equipment shall be identified and match the equipment list required in Item 7. Operating temperatures, pressures, and solvent state of matter shall be identified in each primary step or component. A piping and instrumentation diagram (PID or PI&D) shall be provided.*
9. *Analysis of the vessel(s) if pressurized beyond standard atmospheric pressure. Analysis shall include purchased and fabricated components.*
10. *Structural analysis for the frame system supporting the equipment.*
11. *Process safety analysis of the extraction system, from the introduction of raw product to the end of the extraction process.*
12. *Comprehensive process hazard analysis considering failure modes and points of failure throughout the process. The process hazard analysis shall include a review of emergency procedure information provided by the manufacturer of the equipment or process and not that of the facility, building or room.*
13. *Review of the assembly instructions, operational and maintenance manuals provided by the manufacturer.*
14. *List of references used in the analysis.*

3804.4 Site inspection. *Prior to operation of the extraction equipment, where required by the fire code official, the engineer of record or approved professional, as approved in 3805.2 shall inspect the site of the extraction process once equipment has been installed for compliance with the technical report and the building analysis. The engineer of record or approved professional shall provide a report of findings and observations of the site inspection to the fire code official prior to the approval of the extraction process. The field inspection report authored by engineer of record shall include the serial number of the equipment used in the process and shall confirm the equipment installed is the same model and type of equipment identified in the technical report.*

SECTION 3805 SAFETYSYSTEMS

3805.1 Gas detection. *For extraction processes utilizing flammable gases as solvents, a continuous gas detection system shall be provided. The gas detection threshold shall be no greater than 25% of the lower flammable limit (LFL) of the materials.*

3805.1.1 System design. *The flammable gas detection system shall be listed or approved and shall be calibrated to the types of fuels or gases used for the extraction process. The*

gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL).

3805.1.2 Gas detection system components. *Gas detection system control units shall be listed and labeled in accordance with UL 864 or UL 2017. Gas detectors shall be listed and labeled in accordance with UL 2075 for use with the gases and vapors being detected.*

3805.1.3 Operation. *Activation of the gas detection system shall result in all the following:*

1. *Initiation of distinct audible and visual alarm signals in the extraction room.*
2. *Deactivation of all heating systems located in the extraction room.*
3. *Activation of the mechanical ventilation system, where the system is interlocked with gas detection.*

3805.1.4 Failure of the gas detection system. *Failure of the gas detection system shall result in the deactivation of the heating system, activation of the mechanical ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.*

3805.1.5 Interlocks. *All electrical components within the extraction room shall be interlocked with the gas detection system. Activation of the gas detection system shall disable all light switches and electrical outlets.*

3805.2 Emergency shutoff. *Extraction processes utilizing gaseous hydro-carbon based solvents shall be provided with emergency shutoff systems in accordance with Section 5803.1.3.*

[Chapter 1]

105.6.49 Plant extraction systems. *An operational permit is required to use a plant extraction system.*

105.7.19 Plant extraction systems. *A construction permit is required for installation of or modification* ***to a plant extraction system****. Maintenance performed in accordance with this code is not considered to be* ***modification*** *and does not require a construction permit.*

SECTION 202 DEFINITIONS

DESOLVENTIZING *The act of removing a solvent from a material.*

MISCELLA *A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.*

Notation

Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 10. Carbon dioxide enrichment systems]

105.6.4.1 Carbon dioxide enrichment systems. *An operational permit is required for carbon dioxide enrichment systems having more than 874 cu. ft. scf (100 pounds) of carbon dioxide.*

TABLE 105.6.9

PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide enrichment systems	*874 (100* lbs)
Corrosive	20
Flammable (except cryogenic fluids and liquefied petroleum	20
Highly toxic	Any
Inert and simple asphyxiate[a]	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any
Toxic	Any

For SI: 1 cubic foot = 0.02832 m^3.
a. *For carbon dioxide used in beverage dispensing applications, see Section 105.6.4.*

SECTION 202 DEFINITIONS

CARBON DIOXIDE ENRICHMENT SYSTEM *A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.*

908.8 Carbon dioxide enrichment systems. *A gas detection system shall be provided in rooms and indoor areas in which carbon dioxide enrichment processes are located in accordance with Section 5308.3.4.*

5308.3 Carbon dioxide enrichment systems. *The design, installation and maintenance of carbon dioxide enrichment systems with more than 100 pounds (874 cu. feet scf) of carbon dioxide, or carbon dioxide enrichment systems with any quantity of carbon dioxide with remote fill connections shall comply with Sections 5308.3.1 through 5308.3.8.*

5308.3.1 Permits. *Permits shall be required as set forth in Section 105.6.5.*

5308.3.2 Documentation. *The following information shall be provided with the application for permit:*

1. *Total aggregate quantity of liquid CO2 in pounds or cubic feet at normal temperature and pressure.*
2. *Location and total volume of the room where the carbon dioxide enrichment operation will be conducted. Identify whether the room is at grade or below grade.*
3. *Location of containers relative to equipment, building openings and means of egress.*
4. *Manufacturer's specifications and pressure rating, including cut sheets, of all piping and tubing to be used.*
5. *A piping and instrumentation diagram that shows piping support and remote fill connections.*
6. *Details of container venting, including but not limited to vent line size, material and termination location.*
7. *Alarm and detection system and equipment, if applicable.*
8. *Seismic support for containers.*

5308.3.3 Equipment. *Pressure relief, vent piping, fill indicators, fill connections, vent terminations, piping system, and the storage, use, and handling of the carbon dioxide shall be in accordance with Chapter 53 and NFPA 55.*

5308.3.4 Gas detection system. *A continuous gas detection system shall be provided in the room or indoor area in which the carbon dioxide enrichment process is located, in the room or indoor area in which the container systems are located, and in areas where the heavier than air gas can congregate. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is most likely to accumulate or leaks are most likely to occur. The system shall be designed to detect and notify at a low level alarm and high level alarm.*

1. *The threshold for activation of the low level alarm shall not exceed a carbon dioxide concentration of 5,000 ppm (9,000 mg/m3) Time Weighted Average (TWA) over 8 hours.*
2. *The threshold for activation of the high level alarm shall not exceed a carbon dioxide concentration of 30,000 ppm (54,000 mg/m3). When carbon dioxide is detected at the high level alarm, the system shall activate an audible and visible alarm in an approved location.*

5308.3.4.1 System Activation. *Activation of the low level gas detection system alarm shall automatically:*

1. Stop the flow of carbon dioxide to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible supervisory alarm signal at an approved location within the building.

Activation of the high level gas detection system alarm shall automatically:

1. *Stop the flow of carbon dioxide to the piping system.*
2. *Activate the mechanical exhaust ventilation system.*
3. *Activate an audible and visible evacuation alarm both inside and outside of the carbon dioxide enrichment area, and the area in which the carbon dioxide containers are*

located.

5308.3.5 Pressurization and ventilation. *Rooms or indoor areas in which carbon dioxide enrichment is provided shall be maintained at a negative pressure in relation to the surrounding areas in the building. A mechanical ventilation system shall be provided in accordance with the California Mechanical Code that complies with all of the following:*

1. *Mechanical ventilation in the room or area shall be at a rate of not less than 1 cubic foot per minute per square foot.*
2. *When activated by the gas detection system the mechanical ventilation system shall remain on until manually reset.*
3. *The exhaust system intakes shall be taken from points within 12 inches of the floor.*
4. *The ventilation system piping shall terminate outdoors in an approved location.*

5308.3.6 Signage*. Hazard identification signs shall be posted at the entrance to the room and indoor areas where the carbon dioxide enrichment process is located, and at the entrance to the room or indoor where the carbon dioxide containers are located. The sign shall be a minimum 8 in. (200 mm) wide and 6 in. (150 mm) high and indicate:*

CAUTION- CARBON DIOXIDE GAS

Ventilate the area before entering.

A high carbon dioxide (CO2) gas concentration

In this area can cause asphyxiation.

5308.3.7 Seismic and structural design*. Carbon dioxide system containers and piping shall comply with the seismic design requirements in Chapter 16 of the International Building Code and shall not exceed the floor loading limitation of the building.*

5308.3.8 Container refilling*. Carbon dioxide containers shall not be refilled indoors unless a remote fill connection is provided.*

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 11. A2L refrigerants]

606.13 Discharge location for refrigeration machinery room ventilation. Exhaust from mechanical ventilation systems serving refrigeration machinery rooms containing flammable, toxic or highly toxic refrigerants, other than ammonia, capable of exceeding 25 percent of the LFL or 50 percent of the IDLH shall be equipped with *approved* treatment systems to reduce the discharge concentrations to those values or lower.

Exception: Refrigeration systems containing Group A2L complying with Section 606.17.

606.16 Electrical equipment. Where refrigerants of Groups A2, A3, B2 and B3, as defined in the *California Mechanical Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2 hazardous location classification requirements of NFPA 70.

Exceptions:
1. Ammonia machinery rooms that are provided with ventilation in accordance with the *California Mechanical Code*.
2. Machinery rooms for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 606.17.

606.17 Group A2L Refrigerants *Mechanical refrigeration systems using Group A2L refrigerants shall also comply with Sections 606.17.1 and 606.17.4.*

606.17.1 Machinery rooms. Machinery rooms with systems containing Group A2L refrigerants shall comply with Section 606.17.2 through 606.17.3

Exception: Machinery rooms conforming to the Class 1, Division 2, hazardous location classification requirements of NFPA 70.

606.17.2 Refrigerant detection system. *The machinery room shall be provided with a refrigerant detection system. The refrigerant detection system shall be in accordance with Section 606.8 and all of the following:*

a. The detectors shall activate at or below a refrigerant concentration of 25% of the LFL.
b. Upon activation, the detection system shall activate the emergency ventilation system in Section 606.17.3
c. The detection, signaling and control circuits shall be supervised.

606.17.3 Emergency Ventilation System *An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 606.17.3 Shut down of the emergency ventilation system shall be by manual means.*

TABLE *606.17.3*

Refrigerant	*Q(m^3/sec)*	*Q(cfm)*
R32	*15.4*	*32,600*
$R143_a$	*13.6*	*28,700*
R444A	*6.46*	*13,700*
R444B	*10.6*	*22,400*
R445A	*7.83*	*16,600*
R446A	*23.9*	*50,700*
R447A	*23.8*	*50,400*

R451A	*7.04*	*15,000*
R451B	*7.05*	*15,000*
R1234yf	*7.80*	*16,600*
R1234ze(E)	*5.92*	*12,600*

606.17.4 Emergency Ventilation system discharge. *The point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.*

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 12. Gas Detection Systems]

105.7.9 Gas detection systems. *A construction permit is required for installation of or modification to gas detection systems. Maintenance performed in accordance with this code is not considered a modification and shall not require a permit.*

SECTION 202
~~**CONTINUOUS GAS DETECTION SYSTEM.** A gas detection system where the analytical instrument is maintained in continuous operation and sampling is performed without interruption. Analysis is allowed to be performed on a cyclical basis at intervals not to exceed 30 minutes.~~

GAS DETECTION SYSTEM. *A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.*

~~**GAS DETECTION SYSTEM, CONTINUOUS.** See "Continuous gas detection system."~~

HPM. See "Hazardous Production Material."

~~**604.2.2 Emergency alarm systems.** Emergency power shall be provided for emergency alarm systems as required by Section 414 of the *International Building Code*.~~

604.2.6 Gas detection systems. *Emergency power shall be provided for gas detection systems where required by Sections 604.2.8 and 604.2.14. Standby power shall be provided for gas detection systems where required by Section 916.5.*

606.8 Refrigerant ~~detector~~ detection. Machinery rooms shall ~~contain~~ *be provided with* a refrigerant detector with an audible and ~~visual~~ *visible* alarm. ~~The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TW values shown in the *International Mechanical Code* for~~ *Where ammonia is used as* the refrigerant ~~classification. Detectors and alarms~~, *refrigerant detection* shall ~~be placed in *approved* locations~~ *comply with IIAR 2*. ~~The detector~~ For refrigerants other than ammonia, refrigerant detection shall ~~transmit a signal to an *approved* location~~ *comply with Section 606.8.1*.

606.8.1 Refrigerants other than ammonia. *A detector, or a sampling tube that draws air to a detector, shall be provided at an approved location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an approved location where the concentration of refrigerant detected exceeds the lesser of the following:*

1. The corresponding TLV-TWA values shown in the International Mechanical Code for the refrigerant classification.
2. 25 percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding 25 percent of the lower flammable limit (LFL), whichever is lower shall stop refrigerant equipment in the machinery room in accordance with Section 606.9.1.

901.5 Installation acceptance testing. Fire detection and alarm *systems, emergency alarm systems, gas detection* systems, fire-extinguishing systems, fire hydrant systems, fire standpipe systems, fire pump systems, private fire service mains and all other *fire protection systems* and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as *approved* by the *fire code official*. The *fire code official* shall be notified before any required acceptance testing.

901.6 Inspection, testing and maintenance. Fire detection *and alarm systems, emergency* alarm *systems*, ~~and~~ *gas detection systems*, fire extinguishing systems, mechanical smoke exhaust systems, and smoke and heat vents shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired *fire protection systems* and equipment shall be inspected, tested and maintained or removed.

SECTION 916 GAS DETECTION SYSTEMS

916.1 Gas detection systems. *Gas detection systems required by this code shall comply with Sections 916.2 through 916.11.*

916.2 Permits. *Permits shall be required as set forth in Sections 105.7.9.*

916.2.1 Construction documents. *Documentation of the gas detection system design and equipment to be used that is adequate to demonstrate compliance with the requirements of this code shall be provided with the application for permit.*

916.3 Equipment. *Gas detection system equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturers' instructions.*

916.4 Power connections. *Gas detection systems shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an approved restraining means that secures the plug to the receptacle.*

916.5 Emergency and standby power. *Where standby or emergency power is not required elsewhere by this code, standby or emergency power shall be provided or the gas detection system shall initiate a trouble signal at an approved location if the power supply is interrupted.*

916.6 Sensor locations. *Where a specific location for sensors is not specified elsewhere by this code, sensors shall be installed in approved locations where leaking gases are expected to accumulate.*

916.7 Gas sampling. *Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:*

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
2. For toxic gas that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes in accordance with Section 6004.2.2.7.
3. Where a less frequent or delayed sampling interval is approved.

916.8 System activation. *A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:*

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammable limit (LFL).
2. For non-flammable gases, a gas concentration exceeding the threshold specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinctive from fire alarm and carbon monoxide alarm signals.

916.9 Signage. *Signs shall be provided adjacent to gas detection system alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.*

916.10 Fire alarm system connections. *Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer's instructions.*

916.11 Inspection, testing and sensor calibration. *Inspection and testing of gas detection systems shall be conducted not less than annually. Sensor calibration shall be confirmed at the time of sensor installation and calibration shall be performed at the frequency specified by the sensor manufacturer.*

2308.2.2 Listed equipment. Hoses, hose connections, dispensers~~, gas detection systems~~ and electrical equipment used for CNG shall be *listed*. Vehicle-fueling connections shall be *listed* and *labeled*.

2309.2.2 Listed or approved equipment. Hoses, hose connections, compressors, hydrogen generators, dispensers~~, detection systems~~ and electrical equipment used for hydrogen shall be *listed* or *approved* for use with hydrogen. Hydrogen motor-fueling connections shall be *listed* and *labeled* or *approved* for use with hydrogen.

2311.7.1.1 Design. ~~Indoor~~ *For indoor* locations ~~shall be ventilated utilizing~~ , air supply inlets and exhaust outlets *for mechanical ventilation shall be* arranged to provide ~~uniform~~ *uniformly* distributed air movement ~~to the extent practical. Inlets shall be~~ , *with inlets* uniformly arranged on ~~exterior~~ walls near floor level~~. Outlets shall be~~ *and outlets* located at the high point of the room in ~~exterior~~ walls or the roof.

~~Ventilation shall be by a continuous mechanical ventilation system or by a mechanical ventilation system activated by a continuously monitoring natural gas detection system or, for hydrogen, a continuously monitoring flammable gas detection system, each activating at a gas concentration of not more than 25 percent of the lower flammable limit (LFL). In all cases, the system shall shut down the fueling system in the event of failure~~

Failure of the ventilation system *shall cause the fueling system to shut down*.

The ventilation rate shall be not less than 1 cubic foot per minute [0.03 m3 /minute] per 12 cubic feet [0.34 m3] of room volume.

2311.7.1.2 Operation. The mechanical ventilation system shall operate continuously.

Exceptions:
1. Mechanical ventilation systems that are interlocked with a gas detection system designed in accordance with Sections 2311.7.2 through ~~2311.7.2.3~~ *2311.7.2.2*.
2. Mechanical ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.

2311.7.2 Gas detection system. Repair garages used for repair of vehicles fueled by nonodorized gases, including, but not limited to, hydrogen and nonodorized LNG, shall be provided with a ~~flammable~~ *gas detection system that complies with Section 916. The gas detection system shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.*

~~**2311.7.2.2**~~ ***2311.7.2.1*** ~~**Operation**~~ **System activation.** Activation of ~~the~~ a gas detection ~~system~~ *alarm* shall result in all of the following:
~~1. Initiation of distinct audible and visual alarm signals in the repair garage.~~
1. Initiation of local audible and visible alarms in approved locations.
2. Deactivation of all heating systems located in the repair garage.

3. Activation of the mechanical ventilation system, where the ventilation system is interlocked with gas detection.

~~**2311.7.2.1 System design.** The flammable gas detection system shall be *listed* or *approved* and shall be calibrated to the types of fuels or gases used by vehicles to be repaired. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL). Gas detection shall be provided in lubrication or chassis service pits of repair garages used for repairing nonodorized LNG-fueled vehicles.~~

~~**2311.7.2.1.1 Gas detection system components.** Gas detection system control units shall be *listed* and *labeled* in accordance with UL 864 or UL 2017. Gas detectors shall be *listed* and *labeled* in accordance with UL 2075 for use with the gases and vapors being detected.~~

~~**2311.7.2.3**~~ ***2311.7.2.2*** **Failure of the gas detection system.** Failure of the ~~gas detection system~~ gas detection system shall ~~result in the deactivation of~~ *automatically deactivate* the heating system, ~~activation of~~ *activate* the mechanical ventilation system where the system is interlocked with the ~~gas detection system~~ *gas detection system*, and cause a trouble signal to sound in at an ~~*approved*~~ approved location.

2703.1.3 Signals. The *emergency control station* shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:
1. *Automatic sprinkler system* alarm and monitoring systems.
2. Manual fire alarm systems.
3. Emergency alarm systems.
4. ~~Continuous gas~~ Gas detection systems.
5. Smoke detection systems.
6. Emergency power system.
7. Automatic detection and alarm systems for pyrophoric liquids and Class 3 water-reactive liquids required by Section 2705.2.3.4.
8. Exhaust ventilation flow alarm devices for pyrophoric liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required by Section 2705.2.3.4.

2703.13 ~~Continuous gas~~ Gas detection systems. A ~~continuous~~ gas detection system *complying with Section 916* shall be provided for HPM gases where the physiological warning threshold level of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections 2703.13.1 through 2703.13.2.2.

2703.13.1 Where required. A ~~continuous~~ gas detection system shall be provided in the areas identified in Sections 2703.13.1.1 through 2703.13.1.4.

2703.13.1.1 Fabrication areas. A ~~continuous~~ gas detection system shall be provided in *fabrication areas* where *HPM gas* is used in the fabrication area.

2703.13.1.2 HPM rooms. A continuous gas detection system shall be provided in HPM rooms where *HPM gas* is used in the room.

2703.13.1.3 Gas cabinets, exhausted enclosures and gas rooms. A ~~continuous~~ gas detection system shall be provided in gas cabinets and exhausted enclosures *for HPM gas*. A ~~continuous~~ gas detection system shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.

2703.13.1.4 Corridors. Where HPM gases are transported in piping placed within the space defined by the walls of a *corridor* and the floor or roof above the *corridor*, a ~~continuous~~ gas detection system shall be provided where piping is located and in the *corridor*.

Exception: A ~~continuous~~ gas detection system is not required for occasional transverse crossings of the *corridors* by supply piping that is enclosed in a ferrous pipe or tube for the width of the *corridor*.

2703.13.2 Gas detection system operation. The ~~continuous~~ gas detection system shall be capable of monitoring the room, area or equipment in which the *HPM gas* is located at or below all the following gas concentrations:

1. Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
2. Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet.
3. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet.
4. Except as noted in this section, monitoring for highly toxic and toxic gases shall also comply with Chapter 60.

5307.5 Required protection. Where carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing carbon dioxide storage tanks, cylinders, piping and fittings and other areas where a leak of carbon dioxide can collect shall be provided with either ventilation in accordance with Section 5307.5.1 or ~~an emergency alarm system~~ a *gas detection system* in accordance with Section 5307.5.2.

5307.5.2 ~~Emergency alarm~~ Gas detection system. ~~An emergency alarm~~ *A gas detection system complying with Section 916 shall be provided to monitor areas where carbon dioxide can accumulate. The* system shall ~~comply with all~~ *be designed to initiate a local audible and visible alarm in the room or area in which the sensor is installed when the level* of ~~the following:~~
~~1. Continuous gas detection shall be provided to monitor areas where carbon dioxide can accumulate.~~
~~2. The threshold for activation of an alarm shall not exceed 5,000 parts per million (9,000 mg/m).~~
~~3. Activation of the emergency alarm system shall initiate a local alarm within the room or area in which the system is installed.~~
carbon dioxide exceeds 5,000 parts per million (9,000 mg/m).

5808.5 Gas detection system. Hydrogen fuel gas rooms shall be provided with ~~an approved flammable gas detection system in accordance~~ *a gas detection system that complies* with

Sections *916, and Sections* 5808.5.1 ~~through 5808.5.4~~ *and 5808.5.2*.

~~**5808.5.3**~~ **5808.5.1 ~~Operation~~ System activation.** Activation of ~~the~~ a gas detection ~~system~~ *alarm* shall result in both of the following:
1. Initiation of distinct audible and ~~visual~~ *visible* alarm signals both inside and outside of the hydrogen fuel gas room.
2. ~~Activation~~ *Automatic activation* of the mechanical exhaust ventilation system.

~~**5808.5.1 System design.** The flammable gas detection system shall be *listed* for use with hydrogen and any other flammable gases used in the hydrogen fuel gas room. The gas detection system shall be designed to activate when the level of flammable gas exceeds 25 percent of the lower flammable limit (LFL) for the gas or mixtures present at their anticipated temperature and pressure.~~

~~**5808.5.2 Gas detection system components.** Gas detection system control units shall be *listed* and *labeled* in accordance with UL 864 or UL 2017. Gas detectors shall be *listed* and *labeled* in accordance with UL 2075 for use with the gases and vapors being detected.~~

~~**5808.5.4**~~ ***5808.5.2*** **Failure of the gas detection system.** Failure of the ~~gas detection system~~ gas detection system shall ~~result in activation of~~ *automatically activate* the mechanical exhaust ventilation system~~, cessation of~~ *stop* hydrogen generation, and ~~the sounding of~~ *cause* a trouble signal ~~in~~ *to sound at* an approved location.

6004.2.2.7 Treatment systems. The exhaust ventilation from gas cabinets, exhausted enclosures and gas rooms, and local exhaust systems required in Sections 6004.2.2.4 and 6004.2.2.5 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 6004.2.2.7.1 through 6004.2.2.7.5 and Section 510 of the *International Mechanical Code*.

Exceptions:
1. Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in
storage where all of the following controls are provided:
1.1. Valve outlets are equipped with gas-tight outlet plugs or caps.
1.2. Handwheel-operated valves have handles secured to prevent movement.
1.3. *Approved* containment vessels or containment systems are provided in accordance with Section 6004.2.2.3.
~~1.4. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable~~
~~tanks not exceeding 1,700 pounds (772 kg) water capacity where the following are provided:~~
~~5.1. A *listed* or *approved* gas detection system with a sensing interval not exceeding 5 minutes.~~
~~5.2. A *listed* or *approved* automatic-closing fail-safe valve located immediately adjacent to cylinder~~
~~valves. The fail-safe valve shall close when gas is detected at the permissible exposure limit~~
~~(PEL) by a gas detection system monitoring the exhaust system at the point of discharge~~

~~from~~
~~the gas cabinet, exhausted enclosure, ventilated enclosure or gas room. The gas detection~~
~~system shall comply with Section 6004.2.2.10.~~

2. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable tanks not exceeding 1,700 pounds (772 kg) water capacity where a gas detection system complying with Section 6004.2.2.10 and listed or approved automatic-closing fail-safe valves are provided. The gas detection system shall have a sensing interval not exceeding 5 minutes. Automatic-closing fail-safe valves shall be located immediately adjacent to cylinder valves and shall close when gas is detected at the permissible exposure limit (PEL) by a gas sensor monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room.

6004.2.2.10 Gas detection system. A ~~gas detection system~~*gas* detection system complying with Section 916 shall be provided to detect the presence of gas at or below the PEL or ceiling limit of the gas for which detection is provided. The system shall be capable of monitoring the discharge from the treatment system at or below one-half the IDLH limit *and shall initiate a response in accordance with Sections 6004.2.2.10.1 through 6004.2.2.10.3 if the gas detection alarm is activated.*

Exception: A gas detection system is not required for toxic gases when the physiological warning threshold level for the gas is at a level below the accepted PEL for the gas.

~~**6004.2.2.10.1 Gas detection system components.** Gas detection system control units shall be *listed* and *labeled* in accordance with UL 864 or UL 2017, or approved. Gas detectors shall be *listed* and *labeled* in accordance with UL 2075 for use with the gases and vapors being detected, or *approved*.~~

~~**6004.2.2.10.2**~~ ***6004.2.2.10.1*** **Alarms.** The ~~gas detection system~~*gas detection system* shall initiate a local alarm and transmit a signal to a constantly attended control station when a short-term hazard condition is detected. The alarm shall be both ~~visual~~ *audible* and ~~audible~~ visible and shall provide warning both inside and outside the area where gas is detected. The audible alarm shall be distinct from all other alarms.

Exception: Signal transmission to a constantly attended control station is not required where not more than one cylinder of highly toxic or toxic gas is stored.

~~**6004.2.2.10.3**~~ ***6004.2.2.10.2*** **Shut off of gas supply.** The ~~gas detection system~~*gas detection system* shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for whichever gas is detected.

Exception: Automatic shutdown is not required for reactors utilized for the production of highly toxic or toxic *compressed gases* where such reactors are:

1. Operated at pressures less than 15 pounds per square inch gauge (psig) (103.4 kPa).
2. Constantly attended.
3. Provided with readily accessible emergency shutoff valves.

~~**6004.2.2.10.4**~~ ***6004.2.2.10.3*** **Valve closure.** Automatic closure of shutoff valves shall be in accordance with the following:

1. Where the gas-detection sampling point initiating the ~~gas-detection system~~*gas detection system* alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.
2. Where the gas-detection sampling point initiating the ~~gas-detection system~~*gas detection system* alarm is within a gas room and *compressed gas* containers are not in gas cabinets or exhausted enclosures, the shutoff valves on all gas lines for the specific gas detected shall automatically close.
3. Where the gas-detection sampling point initiating the ~~gas-detection system~~*gas detection system* alarm is within a piping distribution manifold enclosure, the shutoff valve for the compressed container of specific gas detected supplying the manifold shall automatically close.

Exception: Where the gas-detection sampling point initiating the ~~gas-detection system~~*gas detection system* alarm is at a use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve in the gas valve enclosure for the branch line located in the piping distribution manifold enclosure shall automatically close.

6005.3.2 Ozone gas generator rooms. Ozone gas generator rooms shall be mechanically ventilated in accordance with the *International Mechanical Code* with not less than six air changes per hour. Ozone gas generator rooms shall be equipped with a continuous ~~gas-detection system~~*gas detection system* complying with Section 916 that will shut off the generator and sound a local alarm when concentrations above the permissible exposure limit (PEL) occur.

Ozone gas generator rooms shall not be normally occupied, and such rooms shall be kept free of combustible and hazardous material storage. Room access doors shall display an *approved* sign stating: OZONE GAS GENERATOR— HIGHLY TOXIC —OXIDIZER.

6005.5 Automatic shutdown. Ozone gas generators shall be designed to shut down automatically under the following conditions:
1. When the dissolved ozone concentration in the water being treated is above saturation when measured at the point where the water is exposed to the atmosphere.
2. When the process using generated ozone is shut down.
~~3. When the gas detection system detects ozone.~~
3. Failure of the ventilation system for the cabinet or ozone-generator room.
4. ~~Failure~~ *Detection of ozone at concentrations above the permissible exposure limit (PEL) or failure* of the ~~gas-detection system~~*gas detection system* in an ozone-gas generator room.

6204.1.11 Standby power. Standby power shall be provided in accordance with Section 604 for the following systems used to protect Class I and unclassified detonable organic peroxide:
1. Exhaust ventilation system.

2. Treatment system.
~~3. Gas detection system.~~
3. Smoke detection system.
4. Temperature control system.
5. Fire alarm system.
6. Emergency alarm system.

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2

[Item 13. CBC Section Referenced - Editorial Change]

903.2.8 Group R An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.

Exceptions:
1. Existing Group R-3 occupancies converted to Group R-3.1 occupancies not housing bedridden clients, not housing nonambulatory clients above the first floor, and not housing clients above the second floor.
2. Existing Group R-3 occupancies converted to Group R-3.1 occupancies housing only one bedridden client and complying with Section 425.8.3.3 of the California Building Code.
3. Pursuant to Health and Safety Code Section 13113 occupancies housing ambulatory children only, none of whom are mentally ill or mentally retarded, and the buildings or portions thereof in which such children are housed are not more than two stories in height, and buildings or portions thereof housing such children have an automatic fire alarm system activated by approved smoke detectors.
4. Pursuant to Health and Safety Code Section 13143.6 occupancies licensed for protective social care which house ambulatory clients only, none of whom is a child (under the age of 18 years), or who is elderly (65 years of age or over).

***W**hen not used in accordance with <u>area or height increases for automatic fire sprinklers allowed in</u> ~~Section~~ <u>Section</u> ~~504.2 or 506.3~~ ~~of~~ the California Building Code<u>,</u> an automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be allowed in Group R-2.1 occupancies.*

An automatic sprinkler system designed in accordance with Section 903.3.1.3 shall not be utilized in Group R-2.1 or R-4 occupancies.

Notation
Authority: Health and Safety Code Sections 13108, 13108.5, 13114, 13143, 13146, 13210, 13211, 18949.2
Reference(s): Health and Safety Code Sections 13143, 13195, 18949.2